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EXAMINER	
ABOAGYE, MICHAEL	
ART UNIT	PAPER NUMBER
1793	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/588,024	GOLDSCHMIDT ET AL.	
	Examiner	Art Unit	
	MICHAEL ABOAGYE	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 May 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-13 and 17-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11-13 and 17-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application.
6) ☐ Other: _____.

DETAILED ACTION

Status of claims

1. Claim 14-16 and the non-elected claims 20-25 have been cancelled, claim 11 and 12 have been amended, and therefore claims 11-13 and 17-19 and currently under consideration in the Application.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 11, 12 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baumann et al. (US Patent No. 6,050,477) in view of Marcin, Jr et al. (US Patent No. 5,914,059).

Regarding claim 11, Baumann et al. teaches a repair method (see, column 1, lines 60-63) for repairing a component having a base material with an oriented microstructure (equated to the directionally solidified component, see, column 1, lines 29-35), comprising: applying a solder (equated to the braze material (8), see, column 2, lines 25-30) in a region of the component to be repaired wherein the solder comprises a constituent whose melting temperature is lower than the melting temperature of the component base material; and heating the solder with a heat source; melting the solder

material by the heat source wherein the component base material is not melted (see, abstract; column 1, lines 45-51), generating a temperature gradient in the region of the component to be repaired during the heating step to produce an oriented microstructure in the repaired site which comprises the same oriented microstructure as the surrounding base material (see, column 1, lines 45-51, column 2, lines 41-50, column 2, line 66-column 3 , lines 1-18 and figures 3 and 4). (Note, the claim recite soldering method, however one reading the specification as a whole and the fact that the base material is made of a nickel based super-alloy material, a filler material or solder material that is required to have similar material characteristics as the base material would be expected to be a high temperature alloy whose melting point exceed the dictionary definition of "soldering". therefore the claimed soldering is rather interpreted by the examiner as a brazing process. Soldering and brazing are process terminologies used interchangeable in the art.

Baumann et al. fails to teach heating the solder by directly irradiating the solder with a laser beam at chosen speed.

Marcin, Jr et al. teaches a method for repairing a component having a base material with an oriented microstructure (see Marcin, Jr et al., column 2, lines 38-47), comprising: applying a solder in a region of the component to be repaired wherein the solder comprises a constituent whose melting temperature is lower than the melting temperature of the component base material (see, Marcin, Jr et al., column 2, lines 48-59); heating the solder by directly irradiating the solder with a laser beam or by induction heater. Marcin, Jr et al. also teaches directly irradiating the solder with a laser beam at

chosen speed relative to the component or a power of the laser beam for generating a temperature gradient in the region of the component to be repaired during the heating step (see, Marcin, Jr et al., column 2, line 47-column 3, line 24 and column 6, lines 14-28); thereby producing unconstrained and unidirectional solidification in the repaired site and also eliminating stress and cracks in said repaired area (see, Marcin, Jr et al., column 3, lines 5-24, lines 60-65, column 6, lines 64-67 and column 7, lines 30-37). It should be pointed out that said unconstrained and unidirectional solidification produced in Marcin, Jr et al., reads on the claimed oriented microstructure since the two expressions technically means the same.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the process of Baumann et al. to uses a laser heating source since said technique is known in the art as a viable alternative to induction heating as exemplified by Baumann et al., and it allows better control of the heating process, produces unconstrained and unidirectional solidification in the repaired site and also eliminates stress and cracks in said repaired area (see, Marcin, Jr et al., column 3, lines 5-24, lines 60-65, column 6, lines 64-67 and column 7, lines 30-37).

Regarding claim 12, Baumann et al. in view of Marcin, Jr et al., teaches a repair process wherein the temperature gradient is aligned so that it extends in the direction of the orientation of the oriented microstructure of the component base material (see, Marcin, Jr et al., column 4, lines 4-10 and column 7, lines 30-37).

Regarding claim 17, Baumann et al. in view of Marcin, Jr et al. teaches substantially the same steps as claimed, by heating the solder by directly irradiating the

solder with a laser beam and generating a temperature gradient in the region of the component to be repaired, therefore with the same process step, one of ordinary skill in the art would readily recognize that the base material of Baumann et al. in view of Marcin, Jr et al. would equally be heat treated in a similar ways as recited in the claimed invention.

4. Claims 13 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baumann et al. (US Patent No. 6,050,477) in view of Marcin, Jr et al. (US Patent No. 5,914,059) as applied in claim 11 and further in view of McComas et al. (US Patent No. 4,705,203).

Baumann et al. in view of Marcin, Jr et al. fails to teach a soldering/ brazing comprising a dual or two constituents as claimed.

McComas et al. teaches a repair method of a nickel super-alloy article; wherein the solder comprises a first constituent (layer 15) with a melting temperature lower than a melting temperature of the component base material and a second constituent (second layer 25) having a high durability and a melting temperature greater than the first constituent melting temperature but below the base material melting temperature, and the solder is applied in the region of the component to be repaired such that the proportion of first constituent in the solder is greater in the vicinity of the base material than in a portion of the component to be repaired further away from the base material (column 2, lines 26-38, column 3, lines 8-40 and column 4, lines 29-55).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the process of Baumann et al. in view of Marcin, Jr et al. to use soldering/ brazing comprising a dual alloy or two constituents, since the use of said soldering/ brazing technique is known in the art as exemplified by McComas et al., and that said technique allows certain compositional modifications at the repair region to be made to suit particular or desired circumstances or achieve desire results (McComas et al., column 4, lines 28-55).

Regarding claim 18, Baumann et al. in view of Marcin, Jr et al. does not specifically state the form or physical state of the brazing/solder material.

McComas et al. teaches solder/brazing material that is in the form of a powder (McComas et al. Abstract).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the process of Baumann et al. in view of Marcin, Jr et al. to use solder/brazing material in the form of a powder, since the use solder/brazing material in such physical form is known as disclosed by McComas et al., therefore selecting to use solder powder would have only yielded a predictable result (McComas et al. Abstract).

5. Claims 13 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baumann et al. (US Patent No. 6,050,477) in view of Marcin, Jr et al. (US Patent No. 5,914,059) as applied in claim 11 and further in view of Pietruska et al. (US Patent No. 6,503,349).

Regarding claim 13, Baumann et al. in view of Marcin, Jr et al. fails to teach a soldering/ brazing comprising a dual or two constituents as claimed.

Pietruska et al. teaches a repair method of a nickel super-alloy article; wherein the solder comprises a first constituent with a melting temperature lower than a melting temperature of the component base material and a second constituent having a high durability and a melting temperature greater than the first constituent melting temperature but below the base material melting temperature (column 3, lines 35-40), and the solder is applied in the region of the component to be repaired such that the proportion of first constituent in the solder is greater in the vicinity of the base material than in a portion of the component to be repaired further away from the base material (column 3, line 50-column 3, line 15, column 3, lines 45-50).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the process of Baumann et al. in view of Marcin, Jr et al. to use soldering/ brazing comprising a dual or two constituents, since the use of said soldering/ brazing technique is known in the art as exemplified by Pietruska et al. and said technique allows certain compositional modifications at the repair region such providing grain boundary strengthener or repair joint strengtheners repair alloys to be provided (Pietruska et al. ., column 5, lines 5-20).

Regarding claim 18, Baumann et al. in view of Marcin, Jr et al. does not specifically state the form or physical state of the brazing/solder material.

Pietruska et al. teaches solder/brazing material that is in the form of a powder or tape (equated to film) or paste (Pietruska et al., column 3, lines 36-40).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the process of Baumann et al. in view of Marcin, Jr et al. to use solder/brazing material in the form of a powder or tape (equated to film) or paste, since the use solder/brazing material in one of said physical form is known as disclosed by Pietruska et al., therefore selecting to use any one of the known alternative physical forms of solder would have only yielded a predictable result (Pietruska et al., column 3, lines 36-40).

6. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Baumann et al. (US Patent No. 6,050,477), in view of Marcin, Jr et al. (US Patent No. 5,914,059) as applied in claim 11 and further in view of Pietruska et al. (US Patent No. 6,503,349) as applied to claim 18 above and further in view of Philip (US Patent No. 7,416,108).

Baumann et al. in view of Marcin, Jr et al. and Pietruska et al. fails to teach solder in a form of nanopowder.

Philip teaches a method of repairing a super alloy component using solder in a form of nanopowder (see, column 3, lines 1-15 and column 4, lines 51-67).Philips teaches that nano-particles of an alloy or solder are known to exhibit lower incipient surface melting temperature than the melting of the bulk alloy (se, column 3, lines 1-15).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the process of Baumann et al. in view of Marcin, Jr et al. and Pietruska et al. to use solder in a form of nanopowder, since the use of solder in such

particle size is known in the art as exemplified by Philip, and that would allow soldering/repairing to be conducted at a lower temperature, which is much more economical since a lesser heat input requirement (see Philip, column 3, lines 1-15).

7. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Baumann et al. in view of Marcin, Jr et al. and McComas et al. (US Patent No. 4,705,203) as applied to claim 18 above and further in view of Philip (US Patent No. 7,416,108).

Baumann et al., in view of Marcin, Jr et al. and McComas et al. fails to teach solder in a form of nanopowder.

Philip teaches a method of repairing a super alloy component using solder in a form of nanopowder (see, column 3, lines 1-15 and column 4, lines 51-67).Philips teaches that nano-particles of an alloy or solder are known to exhibit lower incipient surface melting temperature than the melting of the bulk alloy (se, column 3, lines 1-15).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the process of Baumann et al., in view of Marcin, Jr et al. and McComas et al. to use solder in a form of nanopowder, since the use of solder in such physical/dimensional from is known in the art as exemplified by Philip, and that would allow soldering/repairing to be conducted at a lower temperature, which is much more economical since a lesser heat input requirement (see Philip, column 3, lines 1-15).

Terminal Disclaimer

8. The terminal disclaimer filed on 07/21/2010 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of copending Application serial # 11/989,214 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Response to Arguments

9. Applicant's arguments with respect to claims 11-13 and 17-19 have been considered but are moot in view of the new ground(s) of rejection.

With respect to claim 11, Applicant's argues that Baumann does not teach "heating the solder by irradiating the solder with a laser beam", Baumann would not be able to teach "choosing a speed of the laser beam relative to the component or a power of the laser beam for generating a temperature gradient in the region of the component to be repaired during the heating step to produce an oriented microstructure in the repaired site which comprises the same oriented microstructure as the surrounding base material.

In response, the Examiner agrees that Baumann does not teach "choosing a speed of the laser beam relative to the component or a power of the laser beam" because he teaches induction heating, yet he is able to generate a temperature gradient in the region of the component to be repaired during the heating step to produce a brazing deposit or a repaired area that has solidified in a directional and monocrystalline manner with both physical and chemical properties similar to the parent or the base

material. It should be pointed out that such structural characterization reads on the claimed phrase of "oriented microstructure in the repaired site which comprises the same oriented microstructure as the surrounding base material" (see, Baumann et al., column 1, lines 29-63). Furthermore Marcin, Jr et al. cures the deficiencies of Baumann et al. by heating the solder with direct irradiating laser beam, and choosing a speed of the laser beam relative to the component or a power of the laser beam in the same manner as in the claimed invention (see, Marcin, Jr et al., column 2, line 47-column 3, line 24 and column 6, lines 14-28); generating a temperature gradient is aligned so that it extends in the direction of the orientation of the oriented microstructure of the component base material (see, Marcin, Jr et al., column 4, lines 4-10 and column 7, lines 30-37).

With respect to claim 12, Applicant's argues that Baumann only teaches that the thermal gradient is produced in the direction of the plate 4. By contrast, Applicant claims that the temperature gradient is aligned so that it extends in the direction of the orientation of the oriented microstructure of the component base material (paragraph 00036 and figure 1 c).

In response, the new reference to Marcin, Jr et al. cures the deficiencies of Baumann et al. by heating the solder with direct irradiating laser beam, and choosing a speed of the laser beam relative to the component or a power of the laser beam in the same manner as in the claimed invention (see, Marcin, Jr et al., column 2, line 47-column 3, line 24 and column 6, lines 14-28); and generating a temperature gradient that is aligned and extended in the direction of the orientation of the oriented

microstructure of the component base material (see, Marcin, Jr et al., column 4, lines 4-10 and column 7, lines 30-37).

With respect to McComas et al., Philip and Pietruska et al. no substantive argument were filed by Applicant.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL ABOAGYE whose telephone number is (571)272-8165. The examiner can normally be reached on Mon - Fri 8:30am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/George Wyszomierski/
Primary Examiner
Art Unit 1793

/M. A./
Examiner, Art Unit 1793